SIMPLE METHODS FOR ESTIMATING HIV PREVALENCE

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An important step in community planning for HIV prevention is an assessment of the extent of the HIV epidemic and likely future trends. Some statistical methods used to estimate HIV prevalence nationally and in areas with high incidence are complex and require large numbers of AIDS cases; thus, those methods cannot be widely used by individual states. This document describes relatively simple methods that states or local areas can use to estimate HIV prevalence; these estimates can assist health departments in preparing for HIV prevention community planning.

This document is an updated version of a document with the same title distributed in 1994. The original document was based in part on information presented at a workshop on national HIV/AIDS projections held at the Centers for Disease Control and Prevention (CDC) in February 1994.

I. AIDS CASE PROJECTIONS

As a result of the expansion of the AIDS surveillance definition in 1993,[1] CDC is currently unable to make AIDS case projections for the United States. Projections would require both estimating the number of living HIV-infected persons who meet the immunologic criteria of the AIDS surveillance definition (based on CD4+ T-lymphocyte count or percentage) and predicting the future pattern of testing and the reporting of test results. Neither of these requirements is now possible.

Most persons reported with AIDS based on the immunologic criteria are not reported again when they have opportunistic illnesses (OIs) diagnosed. Because the number of persons with AIDS-defining OIs can thus no longer be estimated directly from surveillance data, CDC has developed methodology to make this estimate.[2] Regional and national estimates are in Tables 18-20 of the 1994 year-end edition of the HIV/AIDS Surveillance Report. CDC is preparing similar tables for each state that has enough cases for such estimates to be reliable. CDC is also developing computer programs that will permit states to make these estimates with their own data.

When cases diagnosed within the last 4 years are used to examine trends in AIDS incidence by date of diagnosis, it is necessary to adjust for delays in reporting cases. Table 1a contains current CDC estimates of AIDS incidence (by year of diagnosis adjusted for reporting delay) for 1989-1992, for each state, the District of Columbia, Puerto Rico, and other territories, based on cases diagnosed under the 1987 surveillance definition and reported through March 1994 among adults/adolescents $\geq$13 years of age. For reference, Table 1b includes all persons with AIDS diagnosed under the 1993 surveillance definition; although this definition went into effect in 1993, reporting in 1993 included many cases diagnosed in earlier years. For both Table 1a and 1b, the estimates are adjusted for reporting delay but not for incomplete reporting.

CDC's reporting delay adjustment takes into account patients' sex, race/ethnicity, age at AIDS diagnosis, mode of transmission, and geographic region, but the adjustment is not done separately by state. CDC has developed a computer program that will permit states to adjust their own AIDS incidence data for reporting delay. CDC expects to distribute this program later this year.

II. AIDS DEATHS PROJECTIONS

Because CDC cannot project future AIDS cases at this time, it also cannot predict future deaths in persons with AIDS. As is true for trends in AIDS incidence, trends in the number of deaths cannot be determined without adjusting for reporting delays.

Table 2 provides the estimated number of deaths in HIV-infected persons whose AIDS diagnoses (1993 definition) eventually will be reported, by state, for the years 1989-1992. These estimates are adjusted for delays in reporting of both deaths and AIDS diagnoses, but not for incomplete reporting of either. These estimates do not account for HIV-infected persons who died before AIDS was diagnosed. The reporting delay program mentioned above will also be able to adjust AIDS deaths for these delays.

By subtracting cumulative deaths (using data from Table 2) from cumulative AIDS reports (using data from Table 1b), researchers can also estimate current AIDS prevalence (i.e., the number of living persons with an AIDS diagnosis [1993 surveillance definition]).

III. ESTIMATES OF HIV PREVALENCE

HIV prevalence is the number of living HIV-infected persons. Thus, it excludes infected persons who have died but includes persons already diagnosed with AIDS. Two methods can be used to estimate HIV prevalence at the state level: state-specific data from the Survey in Childbearing Women (SCBW) and extrapolation from national estimates.

Comment: Each of the methods described below provides estimates of HIV seroprevalence among adults and adolescents only. However, the margin of uncertainty in these estimates is greater than the seroprevalence among children, so including children would not change the estimates. Dr. Robert Byers (CDC) has recently developed advanced statistical methods for estimating seroprevalence among perinatally infected children. At this time, adaptations of his work are not available for local use.

A. Estimates from the Survey in Childbearing Women

The SCBW provides information on the prevalence of HIV infection among women giving birth to live-born infants. By extrapolation, this information can be used to estimate the prevalence of HIV infection among all women. By taking into account an estimate of the male:female ratio of HIV infections (which may be approximated from AIDS or HIV infection case reports), an estimate of HIV

prevalence among men can be made and combined with that for women, yielding overall seroprevalence.

The steps for using this method are as follows:

1) Estimate seroprevalence among women of childbearing age.

For each age, racial/ethnic, and regional (e.g., urban, rural) group with data available from the SCBW, multiply the proportion of infected women in each group determined from the SCBW by the corresponding census population estimate. Then, sum the prevalence estimates for the different strata. Because older women are excluded from the SCBW and women with AIDS-OIs have very low birth rates, these estimates must be adjusted as described below. Prevalence should be estimated for several consecutive years; a sudden, relatively large change suggests that an estimate may be biased.

Comment: For each state, census estimates by age are available for each year from the U.S. Bureau of the Census. Census estimates by race (or by age and race) are available for 1992, but not for more recent years.

2) Adjust for women older or younger than the childbearing age range.

Divide the seroprevalence estimate for women of childbearing age by the proportion of all AIDS cases diagnosed among women 15-44 years of age in a specific recent year (or a period of several years). Nationally, 85% of women diagnosed with AIDS in 1992 were 15-44 years of age.

3) Adjust for decreased fertility in women with AIDS-OIs.

Preliminary data from the Adult and Adolescent Spectrum of Disease (ASD) project and from the Supplement to HIV/AIDS Surveillance project indicate that fertility is much lower in women with AIDS-OIs than in other HIV-infected women. As a result, an estimate of the number of living HIV-infected women with AIDS-OIs already diagnosed must be added to the estimate obtained in step 2.

To obtain this estimate, compute the cumulative number of women with diagnosed AIDS-OIs (adjusted for reporting delays) minus the cumulative number of deaths in women (adjusted for reporting delays). Divide this difference by an estimate of the completeness of AIDS-OI reporting in women. Nationally, the completeness of reporting is likely to be approximately 90%;[3] thus, the divisor would be 0.90.

NOTE: This adjustment was not included in the document on this subject distributed during 1994.

Comment: The following factors may cause biases in the HIV prevalence estimates obtained from SCBW data:

- Some states may not have race/ethnicity-specific data for the SCBW. Analyses of data from states with data on race/ethnicity show that estimated seroprevalence is approximately 10%-20% higher if race/ethnicity is not taken into account. Because age has less effect on prevalence estimates, lack of age-specific data in the SCBW has less impact.

- This method for estimating HIV prevalence among women assumes that birth rates are similar between infected and uninfected women, except for women who have already developed AIDS-OIs. Preliminary data from the ASD project indicate that birth rates may be higher among HIV-infected women than among uninfected women in some racial/ethnic and age groups. These data also suggest that birth rates are lower among HIV-infected immunosuppressed women (those meeting the immunologic criteria of the 1993 AIDS surveillance definition) than among uninfected women of the same racial/ethnic and age groups. As a result, it is unclear whether this method is likely to underestimate or overestimate the number of HIV-infected women.

4) Estimate seroprevalence among men who have not had AIDS-OIs diagnosed.

A plausible estimate of HIV prevalence among men who have not had AIDS-OIs diagnosed can be obtained by multiplying the estimate of HIV prevalence among women with no AIDS-OI diagnosis by the male:female ratio for AIDS cases diagnosed recently (e.g., during the last year). If HIV incidence in recent years is increasing more among women than among men, then the male:female ratio for AIDS cases would overestimate the male:female ratio for HIV infections. For states with HIV infection reporting, the male:female ratio in HIV infection reports may be used as long as HIV testing and reporting levels are comparable between men and women.

Comment: Because the HIV epidemic began later among women than among men, the male:female ratio is likely to be larger for AIDS cases than for HIV infections. Therefore, if the estimate of seroprevalence in women is accurate, this method would tend to overestimate HIV prevalence in men.

Comment: In states with HIV reporting, the male:female ratio might be larger or smaller for recent HIV reports than for HIV prevalence. The direction of the bias would depend on how rapidly the HIV prevalence sex ratio is changing and how late in the course of HIV disease persons are detected as infected. Suppose that the HIV prevalence sex ratio has decreased over time. If persons tend to be

reported to HIV surveillance late in the course of disease (shortly before being diagnosed with AIDS), then the male:female ratio would tend to be larger for HIV reports than for HIV prevalence. Conversely, if persons tend to be reported to HIV surveillance shortly after becoming infected, then the male:female ratio would tend to be smaller for HIV reports than for HIV prevalence.

5) Estimate seroprevalence among all men by adding the estimated number of living men with diagnosed AIDS-OIs.

   This estimate is obtained from AIDS surveillance data as the difference between cumulative AIDS-OI diagnoses and cumulative AIDS deaths, just as the corresponding estimate for women was obtained in step 4.

B. Extrapolation from national estimates of HIV infection

HIV prevalence in a given area can be estimated by multiplying the national prevalence estimate by the proportion of cases that the area has contributed to national AIDS surveillance (for adults/adolescents meeting the 1993 AIDS surveillance definition). Thus, if an individual area has reported 0.5% of national AIDS cases, national projections would be multiplied by 0.005.

Researchers using this method should consider the following recommendations:

- The contributed proportion should be calculated based on data from a single recent year (or perhaps several recent years) rather than on cumulative data (i.e., the total count from 1981 to the present).

- Ideally, this proportion should be calculated based on cases diagnosed during the selected year (adjusted for reporting delays) rather than on cases reported during that year. In July 1995, such adjustments could be reliably done for cases diagnosed through 1993 for all states, and through 1994 for geographic areas with many AIDS cases. Using cases reported through March 1995, CDC estimates that approximately 81,000 AIDS cases diagnosed in 1993 among adults and adolescents in the United States under the 1993 surveillance case definition will ultimately be reported. The corresponding estimate for 1994 is not yet available.

  Comment: Using year of diagnosis instead of year of report minimizes artifacts of reporting. Local variations in reporting have a greater effect on case counts when cases are tallied by year of report rather than by year of diagnosis (adjusted for reporting delays). Using year of diagnosis also diminishes (but does not eliminate) variations in state-specific AIDS proportions caused by differences in implementation of the 1993 AIDS surveillance definition. If a local area is unable to perform the calculations needed to adjust for reporting delays, an

approximate adjustment can be obtained by dividing the number of reported cases diagnosed in 1992 and 1993 by 0.95 and 0.90, respectively.

- Increases or decreases in the proportion of national cases reported from an area over time should be considered.

  Comment: This proportionate method for estimating HIV prevalence assumes that the proportion of cases contributed by an area has not changed over time. That is, it assumes that the local epidemic resembles the national epidemic in terms of date the epidemic began, rate of initial growth, and composition of risk groups. Researchers using this method should verify that the proportion of cases contributed by the area has remained approximately constant over time. For example, if the proportion of AIDS cases from the area is increasing (and likely to continue increasing), then this method may underestimate HIV prevalence in that area.

  Comment: The current national HIV prevalence estimate of approximately 800,000 to 1.2 million living infected persons is likely to be revised based on work done at CDC in 1994 and 1995, following a workshop conducted in February 1994. Most estimates presented at that workshop were closer to the lower rather than the upper bound of this range.

IV. HIV PREVALENCE ESTIMATES, ALABAMA

These methods for estimating HIV prevalence are illustrated by using data for 1992 from the state of Alabama.

A. SCBW data

1) In Alabama, SCBW data are available by race/ethnicity and age. Based on age- and racial/ethnic-specific data from the SCBW and census data on the number of women in different age and racial/ethnic groups, the estimated seroprevalence for women ages 15-44 is approximately 700. Reviewing similar estimates for 1989-1991 shows no dramatic shifts in this estimate from year to year; thus, this estimate is plausible.

2) Based on current AIDS surveillance data, 80% of AIDS cases diagnosed among women in Alabama in 1992 occurred among women 15-44 years of age. Thus, the estimate of the total number of infected women without AIDS-OIs in Alabama would be:

$$700 \div 0.80 = 875$$

3) Based on current AIDS surveillance data, 212 women in Alabama had had an AIDS-OI diagnosed and 111 women with AIDS had died through 1992 (both adjusted for reporting delays). If 90% of AIDS cases and deaths in persons with AIDS were reported, then there were

(212 - 111) / 0.90 = 112

women living at the end of 1992 with an AIDS-OI diagnosis. Thus, the estimated number of living HIV-infected women in Alabama at the end of 1992 was

875 + 112 = 987, which rounds to 1000.

4) The male:female ratio for AIDS cases diagnosed in Alabama in 1992 under the 1993 surveillance definition was 6.6 to 1. Thus, the estimated number of infections in men without AIDS-OIs (rounded to the nearest 100) would be:

875 x 6.6 = 5775

The estimated number of living men with an AIDS-OI diagnosis at the end of 1992 was 820 (cumulative cases minus cumulative deaths, divided by 0.90). Therefore, the estimated number of HIV-infected men was 6600 (rounded to the nearest 100).

Thus, the estimate of HIV prevalence among adults and adolescents in Alabama would be:

Infected women	1000
Infected men	6600
Total infected	7600

Comment: The male:female ratio for HIV reports during 1992 was 4.2. Interpreting the difference between these sex ratios depends on knowing when in the course of disease HIV-infected persons are being reported to HIV surveillance. The sex ratio among persons with AIDS has been decreasing over time in Alabama, which suggests that the true HIV prevalence sex ratio is less than 6:1. In fact, the male:female ratio among persons with AIDS diagnosed under the 1993 definition was 5:1 in both 1993 and 1994.

B. Extrapolation from national estimates of HIV infection

Approximately 0.9% of all U.S. AIDS cases among adults/adolescents meeting the 1987 surveillance definition were diagnosed in Alabama in 1992 (505 AIDS cases in Alabama divided by 54,366 cases in the United States overall = 0.009 [Table 1a]). Using a likely range for HIV seroprevalence in the United States of 750,000 to 1,000,000 would yield the following estimate of HIV prevalence:

0.009 x (750,000 to 1,000,000) = 6800 to 9000

Comment: This range reflects the possibility that the new CDC estimate for HIV seroprevalence in the United States will be less than 1 million. This range should be replaced by the range given in the estimates that CDC hopes to publish later this year. The proportions of U.S. AIDS cases meeting the 1987 definition that were diagnosed in Alabama in 1990 and 1991 were .0064 and .0087, respectively. Because this proportion increased substantially from 1990 to 1991 and 1992, seroprevalence in Alabama might be higher than the estimate obtained from this method.

To summarize, these methods yield the following estimates of HIV prevalence in Alabama:

Extrapolation from the SCBW:	7600
Extrapolation from national prevalence:	6800 - 9000

It seems reasonable to conclude from these estimates that HIV prevalence in Alabama was approximately 7000-9000 persons at the end of 1992.

Comment: Using a back-calculation model applied to data for Alabama, Dr. Robert Byers (CDC) obtained prevalence estimates of more than 13,000 infected men and 2,700 infected women. Compared with the above estimates, the back-calculation estimates seem too large. Because of a relatively rapid increase in recent AIDS incidence in Alabama, back-calculation estimates indicate that HIV incidence during the last few years is quite high. However, it is well known that back-calculation cannot be used to estimate recent HIV incidence accurately. This example indicates that the use of more sophisticated methods does not necessarily provide more accurate estimates. The plausibility of any method of estimating prevalence should be evaluated.

Comment: Through December 1992, 2704 persons reported to HIV surveillance in Alabama had not been reported with AIDS (based on AIDS cases reported through December 1993). Of these 2704 persons, 2665 had not been reported as dead. Through December 1992, AIDS had been diagnosed in approximately 2253 persons in Alabama (Tables 1b and 2); of these, approximately 1166 had died (both estimates adjusted for reporting delays). These figures indicate that approximately 1100 persons whose AIDS

diagnosis ultimately will be reported were alive with AIDS at the end of 1992. If 90% of all diagnosed AIDS cases are reported, this figure corresponds to an AIDS prevalence of approximately 1200 persons.

These data yield an estimate of approximately 3900 HIV-infected persons in Alabama "known" to HIV/AIDS surveillance who were alive at the end of 1992; 1200 had an AIDS diagnosis, and 2700 did not. It is likely that some persons who were reported to HIV surveillance had an AIDS diagnosis that had not yet been reported. However, because the effect of this double counting should be relatively small, the estimate of 3900 "known" HIV-infected persons should be quite reliable.

Knowledge of local testing practices might be useful in determining which part of the estimated range for HIV prevalence of 7000 to 9000 persons is most plausible. Alabama has an active HIV counseling and testing program that serves approximately 80,000 persons each year. As a result, it is plausible that approximately half of all infected persons are already known to HIV/AIDS surveillance and that the actual number of HIV-infected persons is at the lower end of the estimated range.

V. GENERAL ADVICE

When making HIV seroprevalence estimates, researchers should consider the following recommendations:

- Use whatever local information is available to check the plausibility of estimates.
- Remember: the smaller the number of AIDS cases or HIV infections used in the above calculations, the less reliable the resulting estimates.
- Round off estimates appropriately. Projections cannot be made to the nearest person.
- Present estimates as plausible ranges.
- Document how estimates were obtained, including the assumptions made. If appropriate for the audience, state these assumptions when releasing estimates. Acknowledge the uncertainty of the estimates.

REFERENCES

1. Centers for Disease Control and Prevention. 1993 revised classification system for HIV infection and expanded surveillance case definition for AIDS among adolescents and adults. MMWR 1992;41(RR-17):1-19.

2. Centers for Disease Control and Prevention. Update: Trends in AIDS diagnosis and reporting under the expanded surveillance definition for adolescents and adults -- United States, 1993. MMWR 1994;43:826-831.

3. Rosenblum L, Buehler JM, Morgan WM, et al. The completeness of AIDS case reporting, 1988: a multisite collaborative surveillance project. Am J Public Health 1992;82:1495-1499.

Table 1a. Estimated number of AIDS cases diagnosed under the 1987 AIDS surveillance criteria (adjusted for estimated reporting delays[a] but not for incomplete reporting), by state and year of diagnosis.

	Year of Diagnosis				
	Before 1989	1989	1990	1991	1992
Alaska	70	20	18	24	30
Alabama	488	253	279	440	505
Arkansas	259	132	151	230	242
Arizona	885	378	369	409	449
California	20876	7243	7830	8934	9314
Colorado	957	388	381	519	497
Connecticut	1171	459	481	629	738
Washington, DC	1725	630	688	852	845
Delaware	170	79	96	101	192
Florida	8521	3868	4286	5186	6401
Georgia	2496	1156	1416	1499	1379
Hawaii	398	138	158	202	195
Iowa	147	61	66	101	105
Idaho	33	31	23	39	39
Illinois	2923	1237	1430	1763	2077
Indiana	610	277	352	437	479
Kansas	272	136	145	182	182
Kentucky	292	152	173	173	244
Louisiana	1333	583	624	867	902
Massachusetts	2185	889	860	1002	1118
Maryland	1789	833	974	1166	1406
Maine	117	63	59	58	58
Michigan	1083	552	637	736	795
Minnesota	477	190	208	278	305
Missouri	1156	533	581	706	772
Mississippi	333	198	216	196	290
Montana	33	19	26	20	19
North Carolina	935	508	586	673	849
North Dakota	11	9	7	1	4
Nebraska	110	44	57	60	76
New Hampshire	121	41	52	58	56
New Jersey	6316	2393	2281	2379	2601
New Mexico	175	105	107	127	143
Nevada	316	161	200	292	299
New York	24254	7550	7962	8587	8521
Ohio	1336	620	666	776	913
Oklahoma	446	191	201	258	282
Oregon	551	278	317	316	428
Pennsylvania	2771	1138	1223	1503	1723
Rhode Island	242	88	100	129	131
South Carolina	530	333	375	438	468
South Dakota	15	3	11	3	6
Tennessee	564	292	352	409	597
Texas	7219	2932	3170	3250	3581
Utah	185	97	109	136	130
Virginia	1326	555	646	707	867
Vermont	40	20	25	25	27
Washington	1303	548	631	715	810
Wisconsin	365	141	221	214	277
West Virginia	82	67	55	70	68
Wyoming	26	12	9	12	9
Puerto Rico	2643	1490	1677	1917	1881
Other terrs[b]	64	17	10	28	41

Total	102745	40131	43577	49832	54366

[a] Based on cases reported to CDC through March 1994.

[b] Other territories include the Virgin Islands, Guam, Trust Territories, and Mariana Islands.

Table 1b. Estimated number of AIDS cases diagnosed under the 1993 AIDS surveillance criteria (adjusted for estimated reporting delays[a] but not for incomplete reporting), by state and year of diagnosis.

	Year of Diagnosis				
	Before 1989	1989	1990	1991	1992
Alaska	71	21	18	29	39
Alabama	507	267	305	503	671
Arkansas	263	139	169	258	336
Arizona	922	422	461	551	753
California	21195	7624	8483	10809	13966
Colorado	999	466	471	705	851
Connecticut	1226	493	543	749	1152
Washington, DC	1755	651	730	918	1093
Delaware	175	80	103	118	287
Florida	8884	4083	4630	5816	8601
Georgia	2552	1208	1525	1852	2166
Hawaii	401	139	166	212	253
Iowa	150	65	71	116	180
Idaho	35	32	25	45	62
Illinois	2970	1277	1497	1883	2510
Indiana	626	295	392	496	693
Kansas	279	139	158	212	244
Kentucky	297	163	178	196	291
Louisiana	1369	612	677	966	1230
Maine	2255	934	984	1234	1778
Maryland	1851	892	1088	1383	1957
Maine	119	64	59	68	85
Michigan	1126	600	744	951	1353
Minnesota	487	212	246	353	481
Missouri	1180	581	660	906	1248
Mississippi	341	204	235	225	392
Montana	33	19	28	22	26
North Carolina	962	522	627	750	1052
North Dakota	12	10	8	3	4
Nebraska	114	48	72	81	119
New Hampshire	125	44	57	78	94
New Jersey	6565	2543	2529	2747	3666
New Mexico	179	109	118	149	242
Nevada	319	168	225	343	481
New York	24988	7896	8658	10278	12840
Ohio	1369	645	704	856	1276
Oklahoma	476	201	232	337	467
Oregon	555	283	324	346	606
Pennsylvania	2845	1187	1298	1729	2395
Rhode Island	248	92	108	147	195
South Carolina	562	359	415	578	969
South Dakota	16	3	13	12	16
Tennessee	575	300	377	454	847
Texas	7427	3118	3584	3997	5608
Utah	199	104	131	177	220
Virginia	1366	581	693	841	1291
Vermont	41	22	26	27	44
Washington	1328	584	699	862	1130
Wisconsin	386	176	267	280	464
West Virginia	85	68	58	77	89
Wyoming	27	12	15	21	15
Puerto Rico	2763	1562	1768	2151	2398
Other terrs[b]	65	18	10	31	50

Total	105665	42337	47662	58928	79276

[a] Based on cases reported to CDC through March 1994.

[b] Other territories include the Virgin Islands, Guam, Trust Territories, and Mariana Islands.

Table 2. Estimated number of deaths among persons whose AIDS diagnoses (1993 AIDS surveillance criteria) will be reported to CDC (adjusted for estimated reporting delays[a] but not for incomplete reporting), by state and year of diagnosis.

	Year of Diagnosis				
State	Before 1989	1989	1990	1991	1992
Alaska	41	11	9	18	17
Alabama	263	155	180	257	311
Arkansas	135	85	74	109	118
Arizona	487	236	287	315	423
California	12377	5401	5945	6861	7409
Colorado	556	229	323	408	429
Connecticut	723	303	329	366	507
Washington, DC	973	428	511	527	608
Delaware	95	47	70	72	99
Florida	5121	2589	2915	3418	4034
Georgia	1340	725	911	1094	1243
Hawaii	213	86	113	149	144
Iowa	70	37	40	74	68
Idaho	23	8	22	17	34
Illinois	1557	849	944	1190	1498
Indiana	308	158	204	258	334
Kansas	154	75	94	132	153
Kentucky	170	105	121	127	160
Louisiana	794	398	418	512	672
Massachusetts	1161	568	616	815	969
Maryland	1013	557	696	865	975
Maine	53	28	42	37	47
Michigan	605	362	426	481	573
Minnesota	263	108	170	205	198
Missouri	531	320	345	405	547
Mississippi	191	126	140	152	191
Montana	16	10	9	22	17
North Carolina	499	340	332	487	579
North Dakota	2	0	0	0	1
Nebraska	66	27	35	46	57
New Hampshire	67	23	32	38	40
New Jersey	4226	1687	1778	2096	2269
New Mexico	96	60	62	84	100
Nevada	189	109	121	188	216
New York	16065	6327	6827	7776	8484
Ohio	691	403	466	545	711
Oklahoma	230	136	121	187	229
Oregon	291	149	215	243	295
Pennsylvania	1644	759	887	1000	1206
Rhode Island	130	57	77	93	114
South Carolina	296	176	271	318	433
South Dakota	9	1	3	10	7
Tennessee	306	153	217	283	320
Texas	4181	1882	2291	2528	2780
Utah	119	41	68	86	97
Virginia	766	346	439	545	687
Vermont	20	10	15	16	24
Washington	675	321	391	511	547
Wisconsin	187	92	118	142	181
West Virginia	44	36	47	52	41
Wyoming	11	7	5	8	16
Puerto Rico	1583	992	1073	1307	1361

Other terrs[b]	32	4	6	14	15
Total	61658	28142	31851	37489	42588

[a] Based on cases reported to CDC through December 1993. Reporting delays for deaths based on data reported through March 1994 were not yet available when this tabulation was produced.

[b] Other territories include the Virgin Islands, Guam, Trust Territories, and Mariana Islands.